

METHOD FOR CREATING BARRIERS FOR COPPER DIFFUSION

ABSTRACT OF THE DISCLOSURE

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A barrier layer for a semiconductor device is provided. The semiconductor device comprises a dielectric layer, an electrically conductive copper containing layer, and a barrier layer separating the dielectric layer from the copper containing layer. The barrier layer comprises a silicon oxide layer and a dopant, where the dopant is a divalent ion, which dopes the silicon oxide layer adjacent to the copper containing layer.

A method of forming a barrier layer is provided. A silicon oxide layer with a surface is provided. The surface of the silicon oxide layer is doped with a divalent ion to form a barrier layer extending to the surface of the silicon oxide layer. An electrically conductive copper containing layer is formed on the surface of the barrier layer, where the barrier layer prevents diffusion of copper into the substrate.